

Memorial to Martin N. Sara (1946–2006)

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Martin (“Marty”) N. Sara was one of the truly outstanding practicing American hydrogeologists of his time. Marty, who was born of Dutch-American roots, in Chicago, Illinois, graduated (1969) in geology from the University of Illinois. He then struck out to the West, joining Jim Warner, P.E., the legendary construction water-control grouting specialist. In this job, Marty worked for a perfectionist but withstood the attendant pressure and was quickly placed in charge of his own projects.

Marty’s willingness to seek difficult and challenging assignments forged his basic character as a technically fearless practitioner. Marty learned early to focus not only on the imperatives of his career, but also on working cooperatively to make the profession a better place to practice, as well as to serve the public. Marty’s dedication to the practice of engineering geology and its important sub-element of hydrogeology defines a true “calling” to the profession. He held geological licensure in California, Florida, Indiana, Oregon, Pennsylvania, and Wisconsin.

Marty started out as an engineering geologist, but his involvement always seemed to be in intimate contact with the considerations of groundwater. In this way, and by circumstance, he migrated into the combined area of practice in hydrogeology as applied to site characterization for waste management facilities in his 15th year of his practice (1985).

For the next 21 years, Martin Sara was a constant and always rising presence in and around the practice of hydrogeology. Though he might not have been considered one of the groundwater movers and shakers by academic and government “insiders” to the profession, this indeed was his ongoing impact, and now, his legacy.

I became acquainted with Marty in 1971, during his geology graduate studies (1976 MS degree) as one of my students in “Foundation Engineering,” taught for several years at the University of Southern California. At the time, Marty was with the late Dames & Moore (D&M; geotechnical consultants then headquartered in Los Angeles) and was “on his way up” in that organization. D&M had pioneered several major innovative practices in what was then known as “soils engineering,” which Marty was adept at by that point in his developing career:

- Project geologists performed all data gathering field activities, supervised lab testing, and worked closely with the soils engineer in developing design recommendations;
- Great attention was given to field sampling techniques, mainly designed to provide minimally disturbed samples for one-inch (thick) brass ring slices taken from the “California” drive sampler;
- Active participation in report writing, and;
- Close attention to client relations.



Responding to the well-known draw-to-return that affects Midwesterners, Marty transferred to the Chicago office of D&M in 1975, but was a first-responder to take the company's interests to the Republic of South Africa, in Johannesburg, where he remained for a decade and spent most of that time as manager of the venture. The portrait here is Marty's passport photograph taken in his 28th year, as he and his family departed for South Africa.

In late 1984, Marty returned to Chicago and experienced the turmoil of the drawdown of the established North American consulting firms, the gravity of which eventually destroyed the nature of the profession that many of us had grown up in. These were the well-known forces:

- The crash of the nuclear power plant siting (PSAR; Preliminary Safety Analysis Report) work;
- Federal attacks (U.S. Department of Justice) on qualifications-based selection of professional services;
- Federally fostered bid-shopping and commoditization of professional engineering (and applied geologic) services), and;
- The special-interest set-asides for award of professional services on federal funding projects.

Due to declining revenues and incoming work resulting from funding allocations to various forms of minority and disadvantaged participation in the applied geosciences, as well as being on the low-end of owner-contact in project management, the geotechnical profession was reeling. About that time, the welcome alternative was project work in the new "geoenvironmental" field, which was on the rise in waste management and cleanup work.

As a result of the new emphasis, the "original" Waste Management, Inc. (WMI), came on the scene. WMI had been founded in Chicago (1970) by the Huizenga family, pioneer (1890s) Chicago garbage men of Dutch-American extraction. An early WMI acquisition was ENCOM, the pioneer American environmental geological and engineering firm founded in 1971 by geological engineer Peter Vardy (BS, geological engineering, Mackay School of Mines, University Nevada), late of San Francisco.

Peter applied his considerable, proven organizational and management skills to the overwhelming task of bringing full environmental compliance into the WMI pattern of acquisition and growth. Naturally, the regulatory sphere was of concern in this challenge and Peter brought registered environmental engineer Gary E. Williams over from EPA Region V headquarters, also in Chicago. Together, Gary and Peter further convinced management that a first-class practicing hydrogeologist was a must in order to curb and control the geological siting challenges facing "Waste" (as WMI was then known in our profession). A campaign was launched to identify and secure this talent, and Martin Sara loomed large. Marty joined Gary in creating a concerted and highly visible effort toward responsible environmental engineering and geological compliance with the expanding and multiplying field of environmental regulation.

Peter and Gary saw in Marty a clear path toward establishing excellence out of geologic chaos then found in the incoming consulting reports. Not only were the permit and compliance requirements expanding rapidly, but the "trash" business was faced with dealing with decades of serious pollution and contamination incidents on its older properties, most of which were acquired by aggressive corporate purchase and merger policies.

Consequently, "Waste" (as WMI was then known in our profession) was employing literally dozens of consulting geological and engineering firms. "Waste" had no safeguard against substandard submittals from its consultants. The main problems stemmed from a lack of corporate standardization of qualifications for selection, scope of work, and report format and content of siting, permit application and environmental response reports. These reports were reviewed internally and then submitted by "Waste" to the U.S. Environmental Protection

Agency (established only in 1970) and to the ensuing State environmental agencies being established under RCRA (Federal *Resource Conservation & Recovery Act* of 1976).

Before Peter Vardy sold his ownership interests in WMI and departed, in the late 1980s, he had put Marty in place as chief hydrogeologist. Marty had the charge, the space, and the prerogatives necessary to establish a rising degree of professional excellence in the geologic site studies contracted to WMI. Complimenting Marty's drive, technical competence, and people-working skills was his equally capable immediate engineering supervisor, Gary Williams, performing as corporate manager of environmental compliance.

Marty thrived under the protection, guidance, and support of Gary. The first Sara sole-author master achievement was his emergency (night-and-day) compilation of the *WMI Site Assessment Manual*, completed in full draft form in 1987. Marty wrote most of the manual with his Apple computer, on the breakfast-room table of his Park Ridge home, receiving considerable incidental support from wife Terri and their four children. "SAM" came into life as a custom-published, three-ring binder constituting the body of standard excellence by which WMI's consultants were to be judged for acceptability of their product and for future retention.

In dealing with the huge array of practical site characterization problems facing WMI, Marty originated the monumentally useful concept of the *conceptual site geologic model*, which he promoted as the starting point for all manner of site characterization. This was his single greatest innovation and its impact should have been grounds for election to the National Academy of Science. Marty preached and sold the site conceptual model at every instant. May he also be profoundly remembered for this gift to the profession. It is only fair to say, however, that in Britain, the same general concept was coming to life, contemporaneously, as co-created by Peter Fookes, the British "giant" of our profession, though these two gentlemen never met.

Marty wrote SAM to solve WMI's internal problem with achieving and maintaining quality from its many consultants. Marty thrust SAM forward decisively at WMI, under the Williams concept of standardization. After having been tested as the standard for WMI consultant reports, SAM, the manual, became the manuscript for a monumental effort published in the form of Marty's two later hardcover manuals (1993 and 2003).

In the first (corporate) manual, Marty made liberal use of optically scanned and graphics-edited charts and other drawings originally submitted in reports by WMI's numerous paid consultants. With this new corporate guideline for excellence, Marty and Gary reduced the total number of selected consultants, favoring retention of firms exhibiting the highest degrees of competence, both in corporate philosophy and in quality of staff.

Life was good (and hectic) for the Williams-Sara team at WMI for a decade, until management decided to concentrate its headquarters professional technical staff at the newly-acquired RUST Environment & Infrastructure (RE&I). The RE&I concept was to develop and concentrate in-house geological and engineering technical support and to reduce and further control external consulting costs.

Marty was assigned to RE&I in 1994 and was allowed to work his magic there for three years, until the 1997 Wall Street takeover of the company. Almost immediately the Williams and Sara level of attention to environmental excellence fell under new management priorities. Headquarters was moved to Houston, Texas, and both men and many of their supporting staff left the company. The two innovators continued the battle for excellence in other employment, but never with the security, trust and freedom of their original engagements at the "original" Waste Management, Inc.

In 1993, while still at WMI, Marty published a formal, hardcover revision and expansion, which he nicknamed "Son of Sam," but which was published by CRC Press as *Standard Handbook for Solid and Hazardous Waste Facility Assessments*. Ten years later, Marty made another major revision. So practical and encyclopedic are these last two books that they will remain applicable for several decades into the future.

A natural adjunct to Marty's drive toward corporate geological standardization was his intense participation (Sara and Neilson, 1992) in the related activities of the American Society for Testing & Materials (ASTM; now the International Society for Testing & Materials). Marty was not wholly enthusiastic about reducing geologic judgment to "standards" (and many of us so agree); which is the "way" of ASTM's product. His main argument for participation in ASTM deliberations was that the "guidelines" movement was going to "happen anyway," and that he would try to more positively affect the outcome. Marty achieved this goal by having the special title of *Standard Guide* utilized. In this way Marty gave support to the true professional geological and engineering community in such a way that the advisory nature of the documents would not tend to take on the prescriptive nonprofessional routine of laboratory testing, which is the general nature of ASTM standards.

The "old" (original) WMI, due to its aggressive habit of garbage collection company and landfill acquisitions, was also involved in quite a number of serious hazardous waste cleanup actions, both under the provisions of RCRA (as in compliance actions) and the Superfund law. Of these, Marty's greatest challenge was in representing the company's interests, and those of co-RPs (Responsible Parties) for the long-term remedial actions taken at the Denver-Arapaho Disposal Site ("DADS"). This National Priority List (NPL) site of uncontrolled hazardous waste disposal (along with monumentally larger volumes of nonhazardous solid waste) was located at the far southern end of the former Lowry Air Force Base Gunnery Range, in undifferentiated Denver-Dawson Formation Cretaceous marine weak-rock strata. WMI was a later operator of the facility, from 1980 (following others), until the facility was named to the National Priority List in 1983.

Marty took a lead role in coordinating and managing the efforts of the Lowry Coalition of PRPs, including Denver County. He was keen on applying practical expertise in sedimentologic classification as a means to characterizing the widely variable flysch-type lateral variations in formation density and porosity. Many of his lessons learned made their way into the two *Son of Sam* books.

After dispersal of the original ten-year WMI environmental staff, Marty elected to remain in Chicagoland, in the best interests of his family. During this chaotic bid-shopped era of our profession, Marty was principal hydrogeologist at Geomatrix and then Arcadis (the late Geraghty & Miller), and was area manager for the early environmental engineering and science consulting firm of ERM, Inc., at the time of his untimely affliction. Ironically, Williams came to join the firm in January 2006 as part of a new regional expansion plan, and found only Marty's carefully-maintained empty office, with the company optimistically awaiting his return.

An outstanding feature of Marty's calling to the profession of engineering geology was his constant willingness to give of time and energy for the benefit of younger members of the profession. The University of Missouri–Rolla asked him to serve on a Board of Review for the then-Geological Engineering Department and he willingly did this, and provided visits and lectures for several years. As a result of this intense presence on the part of WMI, many Rolla geological engineers joined the old company and several outstanding alumni are still with the present company.

"Marty stories" contribute to his legend. He managed his affection for a fine dinner and fine wine only as a personal "reward" for his earned successes of the day. Colleague Doug Coenen (of Oregon Waste Systems, then a WMI subsidiary) recalls a fine dinner at a regionally famous restaurant, The Dalles, in Oregon. Marty had been under the scrutiny of company "bean counters" on account of his travel-meal expenses while on travel status. Marty was torn between this insensitive accountability and his own fine taste. Doug was adroitly handed the huge dinner bill (mostly for a bottle of fine vintage) and, sure enough, had to answer to the bean counters. Doug says that the guff was well worth the evening's scintillating association with Marty.

During Marty's life of intense professional activity, he and wife Terri raised their two girls and two boys, and kept a modicum of daily sanity and normality around the Sara home. Marty's energies were truly boundless; his actor's good looks were matched with his impeccable dress code (office or field) and he literally never "lost a minute" in life without moving forward. Martin Sara was the "perfect," perfectly "rounded" example of a practicing member of the profession.

The Sara energies, however, were curbed in his last year of life when it became apparent that an affliction with ALS had begun to curtail this giant's motion. On that realization, first apparent with speech impediment, Marty withdrew to home care, where elder son Marty, just then the first of the children to graduate from university training, devoted himself to join Terri in full-time care of his father.

So large was Martin Sara's real image, and so long was his shadow that those who knew him or crossed his path were fortunate in many ways, and we will long remember him and his good deeds.

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